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SUBJECT: **STUDY ON JANUARY 1998 ICE STORM SHOWS IMPROPER PLACEMENT OF GASOLINE-POWERED GENERATORS AND KEROSENE HEATERS MAJOR CAUSE OF CARBON MONOXIDE POISONING OUTBREAK.**

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AUGUSTA: On this second year anniversary of the January 1998 Ice Storm, the Department of Human Services Bureau of Health announces the publication of a study on the risk factors responsible for the outbreak of carbon monoxide (CO) poisonings during the winter storm power outages.

"The location of gas-powered generators was the most important risk factor associated with the outbreak of CO poisoning in the aftermath of the ice storm," said study co-author and State Toxicologist Dr. Andrew Smith. "Nearly three-quarters of the CO poisoning incidents resulted from improper location of gasoline-powered electrical generators." The study reports that operation of generators in household basements was 300-times more likely to cause CO poisoning as compared to operating generators outside. Operating generators in a structure attached to a house like a garage or enclosed porch was nearly 20-times more likely to result in CO poisoning than when operated outside.

Appearing in the January 7th issue of the Journal of Emergency Medicine, the study also reports that about one-fifth of the CO poisoning incidents involved use of kerosene heaters without adequate ventilation. "The major risk factor for CO poisoning from kerosene heaters was use in a room without any doors to other rooms opened, or if doors were closed, failing to crack a window to prevent CO gas from building-up to unsafe levels" commented Dr. Smith. Lack of awareness of a CO warning was also found to be a significant risk factor.

Carbon monoxide (CO) is a colorless, odorless gas released whenever gasoline, kerosene, propane, firewood or charcoal is burned.

If appliances that burn these fuels are not installed, maintained, and used properly, they can produce a lot of CO as a product of incomplete combustion. This is especially a problem whenever generators, heaters or grills are operated in enclosed or semi-enclosed areas with limited fresh air ventilation, because CO can rapidly build-up to hazardous levels without warning.

CO poisoning can cause flu-like symptoms (without the fever), and high exposures can result in loss of consciousness, brain damage, and even death.

The study notes that to prevent even a small generator that is running inside a garage from producing hazardous levels of CO, garage air would need to be completely replaced with fresh outside air almost every minute. "People should not assume that leaving a garage door partly open or even fully open when running a generator inside their garage will guarantee enough air flow to protect their family from CO poisoning" cautioned Dr. Smith. "And if you have high CO levels in an attached garage, this odorless and dangerous gas will likely find its way into your home."

Other combustion devices identified as being involved with CO poisoning were indoor use of propane space heaters (4 incidents), charcoal grills (2 incidents), portable gas stoves (2 incidents), and a fire place (1 incident). "Though an infrequent practice during the ice storm, the use of charcoal grills inside the home was noteworthy because the resulting CO poisoning tended to be quite severe," warned Dr. Smith.

During the January Ice Storm of 1998, hundreds of individuals sought medical attention in hospital emergency departments for possible carbon monoxide poisoning. Based upon a review of medical records at four central-Maine hospitals, the study documented 100 people with confirmed CO poisoning resulting from 42 separate poisoning incidents. This makes the CO poisoning outbreak following the January 1998 winter storm one of the largest ever reported. The study authors note that the 100 confirmed cases are likely a substantial underestimate of the statewide total of people poisoned by CO in the aftermath of the ice storm. The study only examined medical records at 4 hospitals and only included patients where CO poisoning could be confirmed with a high degree of confidence. "It is also quite likely that some people with CO poisoning may have mistaken their symptoms for the flu and gone untreated and undiagnosed" noted Dr. Smith. The most common symptoms of CO poisoning are headache, nausea, dizziness and vomiting, which are also symptoms of the flu.

Among the 100 people with confirmed CO poisoning, there was one death, eleven people had to be admitted to a hospital, and five others were transferred to receive oxygen therapy in a hyperbaric chamber. The rest of the cases were treated with supplemental oxygen and released within a few hours.

"As a result of the ice storm of January 1998 and concerns about possible Y2K power outages, many Mainers now have gasoline-powered generators" stated Dr. Smith. The study reports that nearly a third of central Maine residents used a generator during the power outages following the ice storm. "These people have invested their money and may be quick to use generators for even minor power outages. We know from our survey work that better than 1-in-10 people who used a generator in the aftermath of the ice storm located it in an attached structure. We are concerned that widespread ownership of generators combined with an apparent lack of awareness about the dangers of operating generators in an attached structure, puts us at risk for future outbreaks of CO poisoning following power outages. The Bureau of Health wants to urge all generator owners to operate these devices safely and outside rather than in any enclosed or semi-enclosed space."

The study reflects a collaborative effort by the Bureau of Health, the U.S. Centers for Disease Control (CDC), Central Maine Medical Center, Maine General Medical Center's Augusta and Waterville campuses, and St. Mary's Regional Medical Center. Dr. Randolph Daley of CDC was the study lead author, with coauthors Dr. Smith from the Maine Department of Human Services Bureau of Health and Drs. Paz-Argandona, Malilay, and McGeehin from CDC. In addition to the review of medical records from the four central Maine hospitals and follow-up telephone survey of people who had experienced CO poisoning by hospital staff, the study included a telephone survey administered by the Bureau of Health to a control population of 522 households randomly selected from the central Maine area. The results of these surveys were used to compare various risk factors for CO poisoning among confirmed CO poisoning cases versus the control population (referred to as a case-control study). The study represents the first evaluation of CO poisoning outbreaks following a winter storm using case-control methodology.

USEFUL LINKS:

- National Institute of Occupational Safety and Health Administration (NIOSH) alert on carbon monoxide poisoning from small gasoline powered engines and tools - www.cdc.gov/niosh/carbon2.html

- Consumer Product Safety Commission: "Carbon Monoxide Detectors Can Save Lives" www.cpsc.gov/cpscpub/pubs/5010.html

The Bureau of Health offers the following recommendations to reduce the risk of accidental carbon monoxide poisoning during the winter heating season:

Recommendations for safe practices during a power outage.

- Generators should only be placed outside the home in and area with plenty of free-flowing outside air / Generators should be placed well away from home windows, doors or air intakes / Generators should not be placed in an enclosed or semi-enclosed space (such as basement, cellar bulkhead, attached garage or porch) where carbon monoxide can build up to dangerous levels and seep into living areas.

- Kerosene heaters should only be used in a well ventilated room, either by keeping doors to other rooms open or keeping a window partially open (at least 1 inch). / Use only K-1 grade fuel in kerosene heaters. / Follow the manufacturer recommendations for setting the proper wick level.

- Outdoor cooking devices (such as gas or charcoal grills, gas camp stoves) should only be used outside.

- Indoor gas cooking stoves should only be used for cooking (not for extended periods of time as a source of heat).

- Keep chimney flue and a window open when burning decorative gas fireplace logs as a heat source.

General recommendations for the winter heating season.

- Install a carbon monoxide monitor that has been certified by Underwriters Laboratory standard #2034 in your home (available at hardware and department stores). Make sure the monitor has a battery power backup, or it won't be of use during a power outage. The Consumer Product Safety Commission (CPSC) recommends that each home should have at least one carbon monoxide detector in the area outside individual bedrooms. CPSC believes that carbon monoxide detectors are as important to home safety as smoke detectors are.

- Perform yearly maintenance on all heating systems, including furnaces, oil and gas-fired water heaters, and fireplaces. Chimneys and flues should be kept clean and unobstructed to prevent the backup of deadly carbon monoxide.

- Know the symptoms of carbon monoxide poisoning. The initially symptoms of CO poisoning are similar to the flu (but without the fever). These symptoms are headache, nausea, dizziness, and vomiting. Other symptoms include fatigue, chest pain, and shortness of breath.

What should you do if you suspect CO poisoning?

If you or anyone in the home suspect you are being poisoned by carbon monoxide, you should first leave the house immediately, and then call your local fire department or 911. Seek medical attention by contacting either the Maine Poison Control Center (1-800-442-6305) or your physician **after** you have left the area where you suspect the carbon monoxide is present.

BACKGROUND INFORMATION ON CARBON MONOXIDE POISONING

What is Carbon Monoxide?

Carbon monoxide, also called "CO" for short, is a colorless, odorless, tasteless and non-irritating gas that can poison a person without warning. CO gas is produced when fuels such as gasoline, kerosene, propane, firewood or charcoal are burned. If appliances that burn these fuels are not installed, maintained, and used properly, CO may accumulate to dangerous levels.

What are the symptoms of CO poisoning?

The initially symptoms of CO poisoning are similar to the flu (but without the fever). These symptoms are headache, nausea, dizziness, and vomiting. Other symptoms include fatigue, chest pain, and shortness of breath. Very high exposures to CO can result in loss of consciousness and death. People with CO poisoning can mistake their symptoms for the flu. Physicians can sometimes misdiagnose patients with CO poisoning as having the flu.

How can CO harm you?

CO poisons by preventing body tissues from getting enough oxygen. CO binds to the oxygen-carrying protein in red blood cells 200-times more strongly than oxygen. This lowers how much oxygen your blood can carry and deliver to your tissues. Your body's initial response to the lack of oxygen is to increase your breathing rate, causing you to inhale even more CO if it is still present in the air. Oxygen demanding organs such as the brain and heart are first to be affected by CO poisoning. The toxic effect of CO is dependent on both the concentration of CO in the air and the length of time you breathe the air. Long-term exposure to a lower CO concentration can produce the same effects as short-term exposure to a high CO concentration.

Are some people more affected by exposure to CO than others?

Yes. CO exposure especially affects unborn babies, infants, and people with anemia or a history of heart disease. Breathing even low levels of CO can cause fatigue and increase chest pain in people with chronic heart disease.

Can CO gas be detected?

Yes, CO can be reliably detected with CO detectors that meet the requirements of Underwriters Laboratories (UL) standard 2034. Look for the UL designation and the number 2034 when buying a detector. Detectors that meet the UL standard will trigger an alarm from either high CO levels over short periods of time or low CO levels over long periods of time. Detectors that meet the UL 2034 standard usually cost between $35 and $85. In order to protect your family during power outages, make sure you have a CO detector that is either battery-powered or has a battery back-up power supply.

If you already own a Nighthawk CO detector manufactured between Nov. 8, 1998 and Mar. 9, 1999 or a Lifesaver detector manufactured between June 1, 1997 and Jan. 31, 1998, check to make sure it was not subject to the Consumer Product Safety Commission voluntary recall of units that might be slow to alarm.

How common is CO poisoning?

Carbon monoxide is responsible for more deaths in the U.S. each year than any other toxicant. Nationwide, it is estimated that there are 900 to 1500 deaths per year are due to unintentional CO poisoning. An estimated 10,000 people with CO poisoning involving consumer products are treated in hospital emergency departments each year. While CO exposure is a year-round problem, the incidence of poisoning and death increases during the winter months. Disaster related outbreaks of CO poisoning are becoming recognized as a public health issue. CO from plugged automobile exhaust has poisoned stranded motorists after blizzards. Outbreaks of CO poisoning have been seen in the aftermath of winter storms, floods and hurricanes.

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